REMARKS

Claims 1-39 were pending in the application. Claims 5 and 32 are canceled. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-4, 6-10, 12-24, 27-31, 33-35 and 38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Dickman et al. (U.S. Pat. App. No. 2001/0049038). This rejection is respectfully traversed.

It is apparent that the DC stream (78) output by the stacks of the system of Dickman et al. is unregulated, and that power conversion electronics are used to regulate the DC output (78) (paragraph [0047], lines 5-7; paragraph [0048]; paragraph [0071], lines 10-11). A power management module (81) receives the unregulated DC stream from the stack assembly (77) and regulates the voltage of the stream to a selected value (Fig. 10; paragraph [0048]). The power management module (81) may contain a DC-DC converter for each stack (76), or alternatively, each fuel cell stack may be electrically connected to, or include, a dedicated DC-DC converter (93) (FIG. 5, 6, 7 and 10; paragraph [0048]). The regulated DC output from the dedicated DC-DC converters may be connected in parallel or in series (paragraph [0048], lines 34-36). Thus it is clear that Dickman et al. teaches voltage regulation and not current regulation. As mentioned in the present disclosure, however, power conversion electronics controls could add considerable cost, mass and volume to a system (specification, paragraph [0022]). In contrast, in various implementations of the present disclosure, parallel

electrical operation of fuel cell stacks and modules is achieved without costly power electronics (specification, paragraph [0037]).

With reference to claims 1-2, 8-9, 13-14, 16-20, 23, 31, 33, 35 and 38, it is stated in the Office Action that a sensor assembly (126) of Dickman et al. is "a current sensor '126' that senses a current generated by one of more of the stacks '76'...". The sensor assembly (126), however, is not disclosed as being a current sensor. To the contrary, Dickman et al. describes a controller (122) that receives inputs from various components of the fuel cell system. Examples of suitable inputs include one or more current operating conditions, such as temperature, pressure, flow rate, composition, state of actuation, load, *etc.* These inputs may be received from the corresponding component directly, or from sensor assemblies (126) associated with the selected components (paragraph [0057]). The sensor assemblies (126) of Dickman et al. are mentioned again in similar fashion in paragraph [0064]: "...For example, display region 132 may display the current values measured by one or more of sensor assemblies 126,... Previously measured values may also be displayed." (paragraph [0064], lines 8-14). It is neither described nor inherent in the system of Dickman et al. to include a current sensor. Even assuming (for the sake of argument only) that the system of Dickman et al. could include one or more current sensors, there is no teaching in Dickman et al. that such sensor(s) would be used for controlling current. As discussed above, Dickman et al. discloses voltage regulation and does not teach or suggest controlling current.

The Office Action, citing paragraph [0061] of Dickman et al., further states that currents produced by the individual stacks of the system of Dickman et al. are balanced,

and that the balancing is performed by adjusting the flow of hydrogen gas, air and/or cooling fluid to the stacks. The control system 120 of Dickman et al. may be used to selectively adjust or interrupt the flow of hydrogen gas, air and/or cooling fluid to one or more of the stacks forming assembly 77. For example, the flow of hydrogen and air, and optionally cooling fluid to a particular stack may be interrupted so that the stack does not produce electric current (paragraph [0061]). There is no teaching or suggestion, however, that stack current sensing or determining is performed in the course of isolating a stack. Further, there is no teaching or suggestion that balancing of individual stack currents is performed in the system of Dickman et al. Still further, Dickman et al. does not teach or suggest selectively adjusting the flow of hydrogen gas, air and/or cooling fluid to one or more stacks in response to a sensed or determined stack current value.

The Office Action states that "gross load current" as recited in the claims is proportional to "total rated power" as described in Dickman et al. Applicant respectfully submits that they are not proportional. "Total rated power output" is defined in Dickman et al. as the combined maximum rated power output of a plurality of stacks in the stack assembly 77. "Maximum rated power output" is defined as the power output that a fuel cell stack is designed, or configured, to use (paragraph [0035]). As is well known in the art, these "rated" values may or may not be reached (and might be exceeded) in any given application. On the other hand, the present disclosure refers to "gross load current" as a total load current generated, *e.g.,* by stacks 104a and 104b (specification, paragraph [0027]).

Referring now to claim 1, the claim is amended to recite "...a plurality of fuel cell stacks connected in parallel and supplying a gross current for a load; a plurality of inputs to and a plurality of outputs from said stacks; and a controller that controls said gross current to produce a desired current through said load by adjusting, based on said gross load current, at least one parameter affecting at least one of said inputs and outputs to produce a desired current from one of said stacks." As previously discussed, Dickman et al. discloses voltage regulation and does not teach or suggest controlling current. Accordingly, the system of Dickman et al. does not anticipate the system recited in amended claim 1. Applicants submit that claim 1 and claims 2-4 and 6-12 (dependent on claim 1) should be allowed.

Additionally, with reference to claim 6 (dependent on claim 1), as previously discussed, Dickman et al. describes voltage regulation for each stack but does not disclose controlling stack current. Applicants submit that claim 6 and claim 7 (dependent on claim 6) should be allowed.

With reference to claim 9 (dependent on claim 1), as previously discussed, Dickman et al. does not disclose a current sensor. Further, Dickman et al. does not disclose using sensed current to determine gross load current.

With reference to independent claim 13, the claim is amended to recite "...a controller that determines a current from one of said stacks to the load, and, based on said determined current, adjusts at least one of said parameters to regulate current through the load." As previously discussed, Dickman et al. discloses voltage regulation and does not teach or suggest current regulation. Accordingly, Applicant submits that claim 13 and claims 14-18 (dependent on claim 13) should be allowed.

Additionally, referring to claim 18 and as previously discussed, the controller of Dickman et al. does not balance stack currents based on gross load current. Applicant submits that claim 18 should be allowed.

With reference to independent claim 19, the claim is amended to recite "...controlling at least one of an input to and an output from a given stack to provide regulation of a desired current through the given stack." As previously discussed, Dickman et al. discloses voltage regulation and does not teach or suggest current regulation. Accordingly, Applicant submits that claim 19 and claims 20-30 (dependent on claim 19) should be allowed.

Additionally, referring to claim 24, as previously discussed, Dickman et al. discloses voltage regulation and does not teach or suggest determining or using current through a stack. Accordingly, Applicant submits that claim 24 should be allowed.

With reference to independent claim 31, the claim is amended to recite "...obtaining a desired set-point for current from one of said stacks; and regulating current produced by said one of said stacks around said set-point; said obtaining and regulating performed by controlling at least one of a plurality of parameters affecting at least one of an input to and an output from at least one said stack." As previously discussed, Dickman et al. discloses voltage regulation and does not teach or suggest current regulation. Accordingly, claim 31 and claims 33-34 dependent on claim 31 should be allowed.

Furthermore, claim 33 is amended to recite "...determining a gross current to the load; and balancing currents from the stacks based on said determined gross load

current." As previously discussed, Dickman et al. does not teach the balancing of stack currents and thus does not teach the recitations of amended claim 33.

With reference to independent claim 35, the claim is amended to recite "...determining a gross current to the load; and balancing currents produced by said stacks based on said gross load current to provide a desired load current, said balancing performed by adjusting one or more parameters affecting at least one of an input to and an output from at least one of said stacks."

As previously discussed, Dickman et al. teaches voltage regulation but does not teach current regulation or balancing stack currents. Applicants accordingly submit that claim 35 and claims 36-39 dependent on claim 35 should be allowed. Additionally, with reference to claim 38, Dickman et al. does not teach determining a current through a stack and thus does not teach the recitations of the claim.

REJECTION UNDER 35 U.S.C. § 103

Claims 11, 25-26, 36-37 and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dickman et al. (U.S. Pat. App. No. 2001/0049038) in view of Boehm et al. (U.S. Pat. No. 6,461,751). This rejection is respectfully traversed.

As previously discussed, Dickman et al. discloses voltage regulation and does not teach or suggest controlling current. Accordingly, the system of Dickman et al. does not anticipate the recitations of claims 11, 25-26, 36-37 and 39. Further, it is admitted that Dickman et al. does not expressly teach using oxygen sensors in the cathode inlet and outlet to determine oxygen consumption and using the determined oxygen

consumption to determine gross load current. Applicant submits that claims 11, 25-26, 36-37 and 39 should be allowed.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: July 28, 2006

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